

Features of the first known association between Syllidae (Annelida, Polychaeta) and crustaceans

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Abstract

This paper reports on a specimen of *Haplosyllides* (Polychaeta: Syllidae) living attached to the pleopod of a female of the pontonine shrimp *Platycaris latirostris* Holthuis, 1952, which in turn lives symbiotically with the scleractinian coral *Galaxea astreata* (Lamarck, 1816) on the Vietnamese coasts of the South China Sea. The worm–shrimp association is considered as ectoparasitic, thus representing the first of its kind observed between polychaetes and shrimps, but also between syllids and crustaceans in general. This mode of life strongly differs from that of the single *Haplosyllides* species currently accepted as valid, *H. floridana* Augener, 1924 from Florida and Cuba (a strict sponge endosymbiont). The discrepancy casts some doubt on the synonymy of *H. floridana* with *Syllis* (*Haplosyllis*) *aberrans* (described from Vietnam). © 2008 Gesellschaft für Biologische Systematik. Published by Elsevier GmbH. All rights reserved.

Keywords: *Haplosyllides*; Syllidae; Symbiotic association; Ectoparasite

Introduction

Parasitism is a rare phenomenon among polychaetous annelids. About 80 species parasitize different marine and freshwater invertebrates and fishes, 40 of them being borers of mollusc shells (Martin and Britayev 1998). This is a very low number, compared to the 8000–13,000 known polychaete species (Hutchings and Fauchald 2000) or even to the 292 commensals (Martin and Britayev 1998). The habitually low infestation rates of those parasites, together with their peculiar mode of life, came up as the most reliable explanations for this scarcity. Many species were originally described from

single or very few specimens and/or have been found rarely or even never again (Martin and Britayev 1998).

Material and methods

In October 2003, a survey of the fauna associated with the scleractinian coral *Galaxea astreata* (Lamarck, 1816) at Mung Island (Nhatrang Bay, Vietnam, South China Sea) was funded by the Russian Foundation for Basic Research (project nos. 05-04-48350 and 07-04-90009) and by INTAS (project YSF 06-10000014-6229). During the survey, a small specimen of *Haplosyllides* Augener, 1924 was found attached to the base of the pleopod of the pontonine shrimp *Platycaris latirostris* Holthuis, 1952, a well-known obligatory associate of the coral. The specimen was collected at 2–3 m depth in the coral

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reef, fixed in a 10% formaldehyde–seawater mixture and preserved in 70% alcohol. In the laboratory, it was photographed with a ProgRes C10 plus digital camera (Jenoptics, Jena) attached to a Zeiss Stemi 2000-C compound microscope. The specimen was then prepared for scanning electron microscopy (SEM) following the standard procedure, and additional digital images were captured with the help of the Windows PRINTER-FACE system using a HITACHI S-3500N microscope at the SEM Service of the ICMB (CSIC).

Results

The specimen of *Haplosyllides* is characterized by two (occasionally three) thick hooked simple chaetae on

each parapodium, usually one thicker than the other(s), all of them with tridentate curved tips (Fig. 1D). A single worm was found among the 87 *Platycaris latirostris* examined (36 of them females). Thus, infestation prevalence was very low: 1.15% for the whole host population, 2.78% for the host females. The worm was found inside the ventral brood pouch of the shrimp, which contained eggs (Fig. 1A and B). It was firmly attached with the pharynx to the base of the exopod of the second right pleopod of the host (Fig. 1B and C). Host tissues were visible inside the pharynx of the worm (Fig. 1B). Likely due to the sucking activity of the parasite, the exopod was substantially reduced in comparison to the other exopods of the right pleopod, as well as to the corresponding one from the left pleopod (Figs. 1B and C).

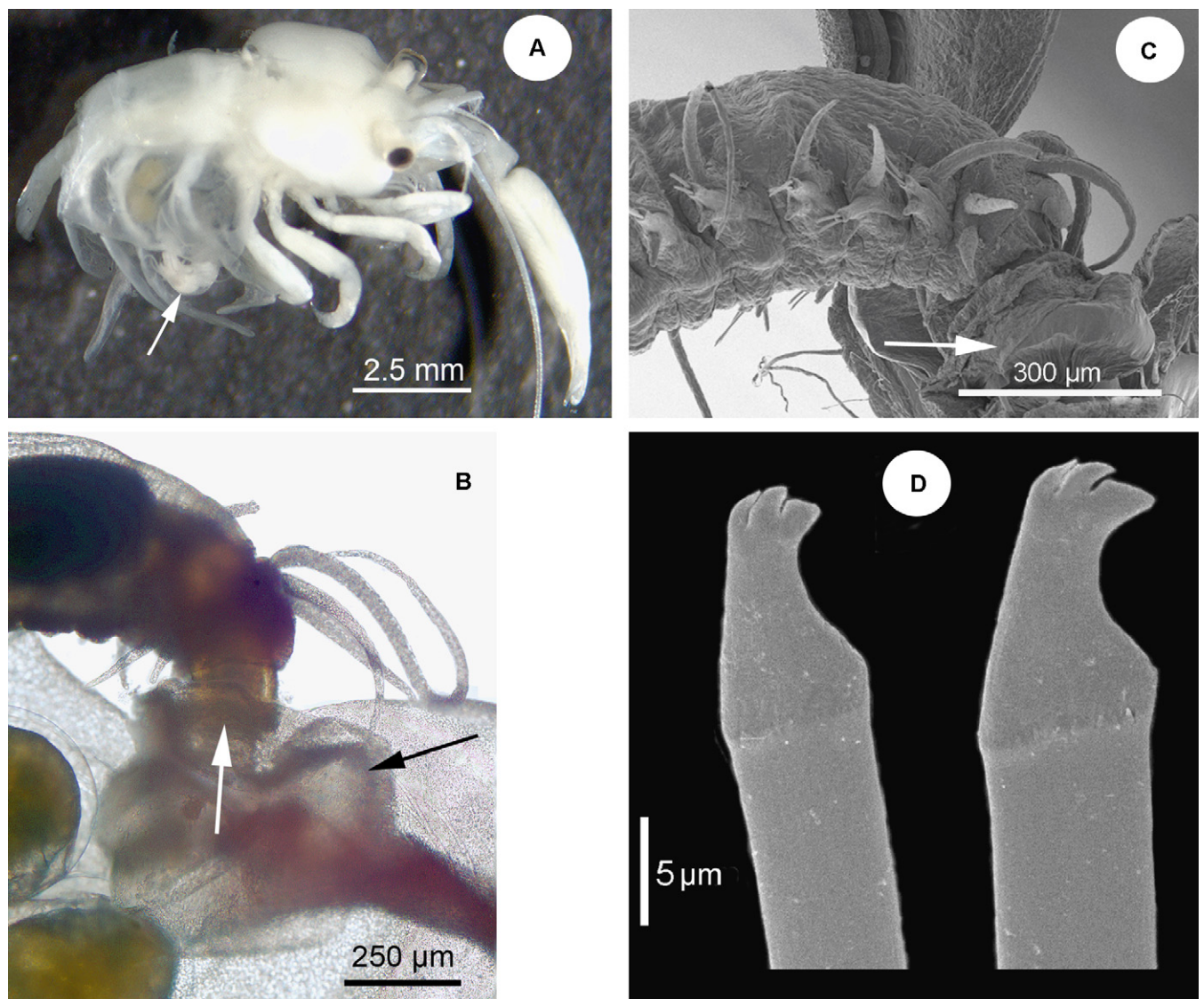


Fig. 1. (A) Whole view of *Platycaris longirostris* with the *Haplosyllides* inside the ventral brood pouch (white arrow). (B) Detail of attachment to exopod; black arrow points to reduced exopod, white arrow to host tissues inside worm pharynx. (C) Detail as in (B), under SEM; white arrow points to reduced exopod. (D) Hooked simple chaetae of worm.

Discussion

Haplosyllides has been considered as a monotypic genus (Uebelacker 1982). The single species currently accepted as valid, *H. floridana* Augener, 1924, was described from Florida and later redescribed from Cuba (San Martín et al. 1997), in the latter case as a strict endosymbiont of the sponge *Xetospongia muta* (De Laubenfels, 1930). However, the present synonymy of *H. floridana* includes *Syllis* (*Haplosyllis*) *aberrans* Fauvel, 1939, described from material collected in coral reefs on the same Vietnamese coasts as the specimen reported here. The specimens of *S. aberrans* were swimming, non-ripened adults captured with the help of a light trap (Fauvel 1939). This demonstrates the ability of non-epitokous adult worms to swim, which appears to be an obligatory requirement in connexion with the association to *Platycaris latirostris*. To enter the ventral brood pouch of the shrimp and reach the host's pleopod, the syllid must first pass through a field of the nematocyst-armed crowns of tentacles of *Galaxea astreata* (the shrimp's host). This suggests that the association may not be accidental, while the presence of hooked chaetae — structures comparable to those of other known symbiotic polychaetes, particularly syllids (Martin and Britayev 1998) — also points to a specialized symbiotic mode of life. Finally, the attachment to a host's exopod that was reduced in size, and the presence of host tissues inside the worm, strongly suggest an ectoparasitic relationship.

The most common hosts of parasitic polychaetes are sponges and other polychaetes. The former are mainly parasitized by Syllidae, the latter by Oeonidae, Calamizidae, Iphitimidae, Spionidae and Syllidae. The only known polychaetes parasitizing decapods are *Dipolydora commensalis* and *Polydora robi*, borers of hermit crab shells, which occasionally feed on their eggs (Williams 2001). There are no previous reports of polychaetes parasitizing shrimps (Martin and Britayev 1998). Thus, the association presented here would be the

first and only one known between a polychaete and a shrimp, but also between syllids and crustaceans in general.

The fact that the Vietnamese specimens appeared to be facultative ectoparasites of shrimps seems to be in contradiction with the obligatory sponge–endosymbiotic relationship of the Cuban specimens of *Haplosyllides floridana*. This casts some doubt on the currently held synonymy between *Syllis* (*Haplosyllis*) *aberrans* Fauvel and *Haplosyllides floridana* Augener sensu Uebelacker (1982) and San Martín et al. (1997). Therefore, the specific identity of the corresponding animals should be reassessed.

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